Space Weather Forecast

Issued on Friday, 21 January 2022 at 01:23 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Slight chance Minor Geomagnetic Storm intervals. Solar activity has been High. A Minor Solar Radiation storm occurred.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: There are five numbered sunspots containing active regions on the Earth-facing disc, although two will soon rotate behind the western limb. One of these region produced a Moderate flare at 20/0601 UTC, with an associated CME following, which has been analysed to miss Earth. A filament eruption from the southwest quarter, around 20/0800-0830 UTC, also produced a CME, and this CME may produce glancing impacts to Earth on the day 4 (24th). The remaining spots groups showed little activity, or changes in complexity, and are generally small and magnetically simple.

Solar Wind / Geomagnetic Activity: The solar wind was mainly between 460-500 km/s, peaking at 536 km/s at 20/0216 UTC The total magnetic field strength was weak, with the important north-south component weakly variable. Geomagnetic activity was Quiet to Unsettled.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) increased following the Moderate flare, Minor Radiation Storm level being exceeded between around 20/0800-1605 UTC, with a peak of 23pfu at 20/1015 UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: There continues to be a slight chance of further isolated Moderate class flares as AR2929 rotates off the west limb today. From tomorrow the risk decreases, with AR2929 further behind the western limb. Thereafter Very Low or Low solar activity is expected, barring any new sunspot development elsewhere on the visible disc, as no new significant regions are expected to rotate onto the visible disc.

Solar Wind / Geomagnetic Activity: There are three potential CME arrivals through the period; there is a chance of a glancing impact either late today (21st) or early tomorrow (22nd) from the CME from the Moderate flare on the 19th. Another CME, generated by the filament eruption in the southwest quadrant yesterday, may brush Earth with limited impacts on day 4 (24th). However, confidence is low regarding these CMEs. A further slower, and weak CME which occurred on the 19th has the potential to arrive day 3 (23rd), with confidence slightly higher for some limited impacts at Earth. Geomagnetic activity is forecast to be mostly Quiet to Unsettled, but a slight chance of increasing Active to G1/Minor storm levels from any CME arrival.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to slowly decrease back to background levels through the next two days.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	20	20	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	10	5	1	1
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	10	5	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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